

ABSTRACT OF THE DISCLOSURE

On an upper surface of a silicon (Si) substrate, an $\text{Al}_{0.2}\text{Ga}_{0.8}\text{N}$ layer having a film thickness of 0.2 μm to 0.3 μm and a GaN layer having a film thickness of 0.5 μm are formed successively. The resulting substrate is set in a halide VPE apparatus so that the resulting substrate can be independently etched with HCl gas from a rear surface of the resulting substrate. While a GaN layer is epitaxially grown on the GaN layer at 900°C by a halide vapor-phase epitaxy method, the silicon (Si) substrate, the $\text{Al}_{0.2}\text{Ga}_{0.8}\text{N}$ layer and the GaN layer are removed from the rear surface by gas etching. In this manner, the GaN layer having a film thickness of about 50 μm is obtained. While a GaN layer is epitaxially grown on the GaN layer at 1050°C by a halide vapor-phase epitaxy method, the GaN layer is removed from the rear surface by gas etching. Finally, a substrate made of the GaN layer with a film thickness of 200 μm and free from any warp and any crack is obtained.